

Vadose Zone Fact Sheet

Lawrence Berkeley National Laboratory

Background: The 82-hectare (200-acre) Lawrence Berkeley National Laboratory (LBNL) site is located on the western side of the Berkeley Hills adjacent to the Berkeley Campus of the University of California. LBNL conducts a wide range of energy-related research activities, including research in nuclear and high-energy physics; accelerator research and development; materials research; and chemistry, geology, molecular biology, and biomedical research.

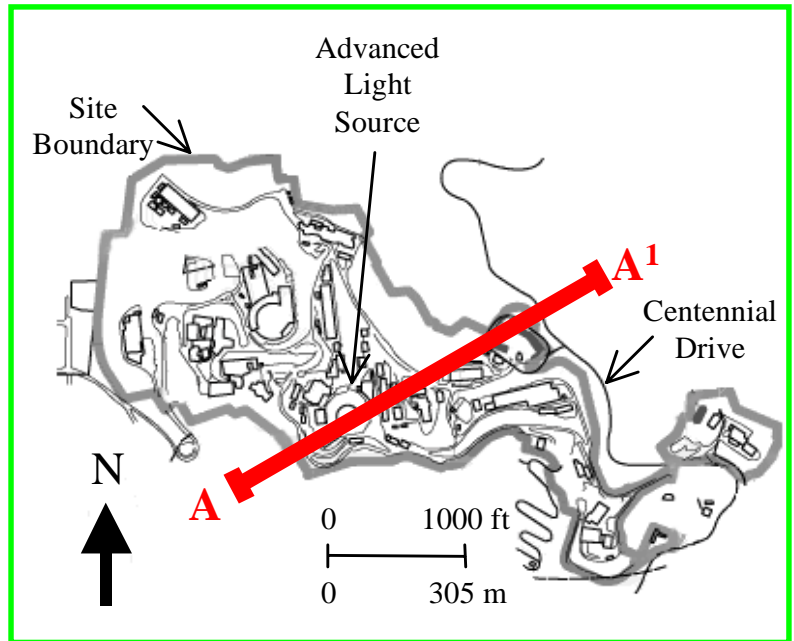
Issues: The site is located in a high-density population area.

Vadose zone infiltration: Vadose zone infiltration can locally be high.

Vadose zone characterization/remediation: LBNL is in the process of identifying areas of vadose zone contamination; determining the sources and extent of contamination; and developing and implementing plans to remediate contaminated areas. Remediation projections include excavating contaminated soils and disposing of them offsite, soil vapor extraction, and monitoring.

Precipitation: Rainfall at LBNL averages 64 cm (25 in) per year.

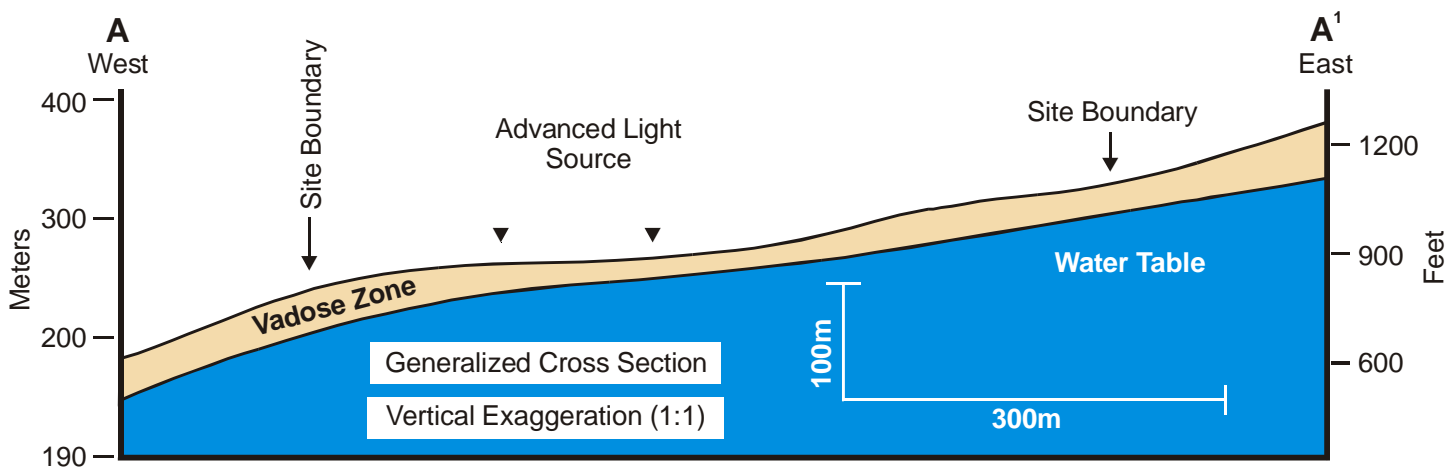
Surface waters: Three main creeks drain the site, the west trending Strawberry Creek on the south side of the site, the west trending Blackberry Creek on the western portion of the site, and the north-south trending Chicken Creek on the east side of the site.



Geology: The site is highly faulted and fractured with moderate to locally steep relief, ranging from 152 to 320 m (500 to 1,050 ft) above sea level. Bedrock is composed of shale, siltstone, sandstone, and conglomerate overlain by low permeability rocks overlain by deeply weathered volcanic rocks. Grading activities have significantly altered the original topography, with cuts up to 12 m (40 ft) deep and fills up to 21 m (70 ft) thick. Artificial fill, colluvium, alluvium, and landslide deposits cover the area.

Vadose zone thickness: The vadose zone ranges from 3 to over 27 m (10 to 90 feet) in thickness.

Major contaminants of concern: Volatile organic compounds (VOCs), petroleum hydrocarbons, polychlorinated biphenyl, Freon, mercury, and tritium.



Ground Water Fact Sheet

Lawrence Berkeley National Laboratory

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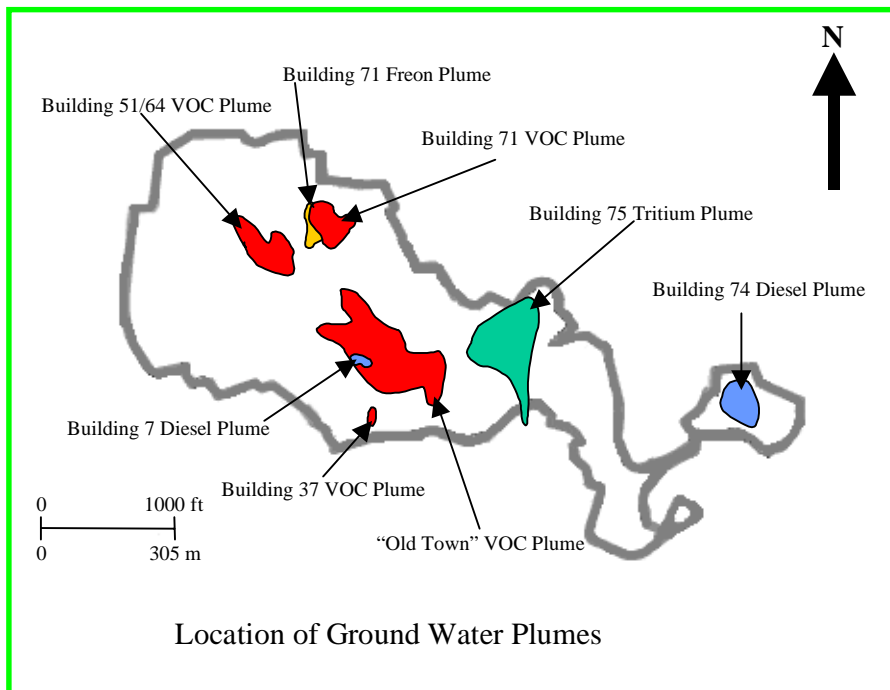
Hydrogeology: The weathered volcanic rocks are the main water-bearing unit, with the ground water flow generally through fractures. Confined aquifers may form in the relatively impermeable units underlying the volcanic rocks. Deeper ground water flow is also generally through fractures in the rocks. The ground water flows basically to the west in the western portion of the site and to the south in the remainder of the site.

Issues: LBNL assumes that established regulatory standards, such as Maximum Contaminant Levels under the Safe Drinking Water Act and background levels found in the environment, will be used as cleanup levels for ground water. However, final cleanup levels will be negotiated with the regulators upon completion of the site risk assessment.

Ground water characterization/remediation:

During the investigation phase, several Interim Corrective Measures have been implemented to mitigate identified contamination and to prevent offsite migration. The site cleanup strategy will be finalized after investigations, corrective measures studies, and risk assessments are completed. Remedial actions will probably involve extraction and treatment of ground water, monitored natural attenuation, and monitoring. Dense non-aqueous phase liquids (DNAPLs) are present in low permeable materials.

Ground water use: In general, the ground water is potable and has potential residential uses, but is not currently being used for that purpose.



Plume Designation	Major Contaminants	Depth	Remedial Approach
B-51/64	1,1-DCA; 1,1-DCE; DCE; 1,1,1-TCA; TCE; As	3 m (10 ft)	TBD
B-71 Freon	1,1,2-Trichloro-trifluoro-ethane	9 m (30 ft)	TBD
B-71 VOC	PCE; TCE; Cis1,2-DCE	6 m (20 ft)	TBD
B-7E	TCE	8 m (25 ft)	TBD
Old Town	Carbon tetrachloride; 1,1-DCA; 1,2-DCA; 1,1-DCE; cis1,2-DCE; PCE; TCE	9 m (30 ft)	TBD
B-75	Cis1,2-DCE; benzene; tritium	9 m (30 ft)	TBD

DCA = dichloroethane; DCE = dichloroethylene; TCA = trichloroethane; TCE = trichloroethylene; As = arsenic; PCE = perchloroethylene; TBD = to be determined